

# SUBJECT INDEX

## A

### Acetazolamide

- carbonic anhydrase III and, 673
- citulline synthesis and, 688
- erythrocyte membrane permeability and, 626-27
- renal carbonic anhydrase and, 653

### Acetylcholine

- acinar cell ion channels and, 71
- acinar cell receptors for, 66
- gastric acid secretion and, 17, 41
- gastrin release and, 50
- myenteric plexus and, 84
- salivary secretion evoked by calcium ion and, 65
- sodium-potassium pump and, 300
- sympathetic preganglionic neurons and, 556

### Acetylcholine receptor

- Drosophila*, 381-83
- potential sensitivity of, 277

### Acetyl CoA

- pyruvate dehydrogenase and, 684

### Acetyl CoA carboxylase

- fatty acid synthesis and, 684-85

### Acid-base balance

- disorders of
- chloride transport and, 141-54

### Acidosis

- renal tubular
- chloride shunt and, 152
- respiratory, 153-54

### Acids

- sympathetic sensory fibers of heart and, 608

### Acinar cells

- cation channels in
- calcium-activated, 68
- chloride channels in
- calcium-activated, 68
- electrophysiology of, 65-77
- ion channels in
- activation of, 70-73
- regulation of, 73-75
- potassium channels in
- calcium-activated, 66-68
- secretion of
- ion channels and pumps and, 75-77

- sodium ion-amino acid co-transport in, 69-70

- sodium-potassium pump of
- phorbol esters and, 299-300

### ACTH

- See Adrenocorticotrophic hormone

### Adenosine triphosphate

- acinar cell receptors for, 66
- caged, 12
- erythrocytic phosphate modulation and, 163
- muscular contraction and, 2
- synthesis of
- electric field-induced, 277-79
- vasoconstriction and, 526

### Adenylate cyclase

- acinar cell receptors for, 65

### Adenylyl cyclase

- ovarian follicle and, 443-44

### Adipocytes

- sodium-potassium pump of
- insulin and, 298-99

### Adrenocorticotrophic hormone

- aldosterone secretion and, 417-20
- carboxypeptidase E and, 313
- cortisol secretion and, 417
- enzymes regulated by, 435-37
- proopiomelanocortin and, 324
- steroidogenic enzymes and, 431-34

### Adrenodoxin

- pregnenolone formation and, 428

### Alanine

- cotransport in acinar cells, 69-70

### Albers-Post model, 227

### Alcohol

- gastrin release and, 45

### Aldosterone

- chloride depletion alkalosis and, 149
- chloride reabsorption and, 129
- corticosterone conversion to, 429
- outer medullary collecting tubule and, 135

### Aldosterone secretagogues, 410-20

### Aldosterone secretion

- aldosterone secretagogues and, 410-20
- atrial natriuretic peptide and, 420-21
- dopamine and, 421-22

- factors inhibiting, 420-22
- neurotransmitters and, 420
- pituitary and, 417-20
- potassium and, 415-17
- regulation of, 409-23
- renin-angiotensin system and, 410-15

### Alkalosis

- metabolic, 141-52
- Barter's syndrome and, 152
- chloride depletion in, 142-50
- mineralocorticoid excess and, 150-52
- potassium depletion and, 150-52

### Alligator mississippiensis

- alkaline urine of, 709

### Alpha ketoglutarate de-

- hydrogenase
- carbon dioxide and, 684

### Alytesin

- gastric acid secretion and, 25

### Amidorphin

- reserpine and, 342

### Amiloride

- sodium chloride reabsorption and, 115

### Amino acids

- cotransport in acinar cells, 69-70
- gastrin release and, 44-45
- myenteric plexus and, 84
- sympathetic preganglionic neurons and, 558-59

### $\gamma$ -Aminobutyric acid

- arterial pressure and, 516
- gastrin release and, 51
- myenteric plexus and, 85-86
- sympathetic preganglionic neurons and, 558

### Aminoglutethimide

- adrenocorticotrophic hormone and, 436

### 2-Aminophosphonoveralate

- sympathetic preganglionic neurons and, 547

### Amygdala

- cardiorespiratory control and, 601
- gastric acid secretion and, 20

### Androgens

- production of, 429-30

### Androstenedione

- production of, 429-30
- progesterone conversion to, 448

- Anesthesia  
  vasoconstrictor neurons and, 532
- Angiogenin  
  luteal angiogenesis and, 472
- Angiotensin  
  sodium-potassium-ATPase and, 295
- Angiotensin II  
  aldosterone secretion and, 410-15  
  Leydig cell and, 491  
  proximal chloride reabsorption and, 125  
  sodium-potassium pump and, 299  
  spinal man and, 586
- Antacids  
  gastrin release and, 46
- Anthrane-9-carboxylic acid  
  chloride absorption in renal tubules and, 102
- Antidiuretic hormone  
  chloride transport and, 119-20, 128  
  cortical collecting tubule and, 133  
  distal tubule and, 131  
  proximal chloride reabsorption and, 125  
  sodium chloride reabsorption and, 114
- Aquometmyoglobin  
  ion binding in, 190
- Arginine vasopressin  
  See Vasopressin
- Ascorbate  
  peptide  $\alpha$ -amidation and, 340
- Ascorbic acid  
  peptide  $\alpha$ -amidation and, 336
- Aspartate  
  sympathetic preganglionic neurons and, 547
- ATP  
  See Adenosine triphosphate
- Atrial natriuretic factor  
  inner medullary collecting tubule and, 136
- Atrial natriuretic peptide  
  aldosterone secretion and, 420-21  
  chloride transport and, 119-20
- Atropine  
  gastrin release and, 42, 44, 51
- Autonomic dysreflexia, 581-83  
  cardiovascular changes in, 583
- B**
- Baclofen  
  gastric acid secretion and, 25
- Bacteria  
  thermophilic  
  adenosine triphosphate synthesis in, 277
- Baroreceptors  
  sympathetic neural activity and, 569
- Barter's syndrome  
  metabolic alkalosis and, 152
- Batrachotoxin  
  sodium ion channels and, 397
- Benzilium  
  gastrin response to sham feeding and, 42
- Benzodiazepines  
  sympathetic preganglionic neurons and, 558
- Benzolamide  
  renal carbonic anhydrase and, 653
- Bethanechol  
  gastric acid secretion and, 27  
  gastrin release and, 51
- Bicarbonate synthesis, 695-714  
  carbon dioxide excretion and, 712-14  
  cerebrospinal fluid and, 706-9  
  chemistry of, 697-98  
  eye and, 704-6  
  kidney and, 709  
  pancreas and, 699-703
- Bicuculline  
  arterial pressure and, 516  
  sympathetic preganglionic neurons and, 560
- Birds  
  salt glands of, 714
- Birefringence  
  muscular contraction and, 12-13
- Blood  
  carbon dioxide exchange in velocity of, 623-35
- Blood-myenteric barrier, 83
- Blood pressure  
  sympathetic neural activity and, 568
- B lymphocytes  
  sodium entry into  
  growth factors and, 212
- Bohr effect, 181-99  
   $\beta$ 146 histidine and, 183-86  
  carbon dioxide and, 187-88  
  chloride and, 186-87  
  stepwise, 191-93
- Bombesin  
  acinar cell receptors for, 66  
  gastric acid secretion and, 25-27, 49-50  
  gastrin release and, 50-51
- Bradycardia  
  sympathetic neural activity and, 573
- Bradykinin  
  coronary artery occlusion and, 611-12  
  cortical collecting tubule and, 133-34  
  sympathetic sensory fibers of heart and, 608
- Brain peptides  
  See Neuropeptides
- Bromocriptine  
  peptidyl-glycine  $\alpha$ -amidating monooxygenase and, 342
- Bulimia  
  metabolic alkalosis and, 152
- Bumetanide  
  chloride transport and, 119-20  
  sodium chloride reabsorption and, 112-13
- C**
- Caenorhabditis elegans*  
  myosin gene of  
  DNA sequencing and, 10
- Caffeine  
  gastrin release and, 45
- Calcitonin  
  cortical collecting tubule and, 133  
  distal tubule and, 131  
  gastric acid secretion and, 27-28  
  proximal chloride reabsorption and, 125
- Calcitonin gene-related peptide  
  gastric acid secretion and, 28-29  
  myenteric plexus and, 88-90
- Calcium  
  caged, 12  
  intracellular  
  release of, 209  
  sodium ion-hydrogen ion exchange and, 213-15
- Calcium carbonate  
  gastrin release and, 45
- Calcium ion  
  acetylcholine-evoked salivary secretion and, 65  
  acinar cell ion channels and, 66-68
- Calcium ion channels  
  activation of  
  mitogens and, 209-10
- T lymphocyte  
  inositol trisphosphate and, 74
- Calmodulin  
  ouabain and, 298-99  
  sodium-potassium-ATPase and, 296-99

- Calnaktin  
sodium-potassium-ATPase and, 292-95
- cAMP  
potassium and, 417  
steroidogenesis and, 430
- Capillary transit time  
carbon dioxide exchange and, 632-33
- Carbonyl phosphate synthetase  
pyrimidine synthesis and, 685
- Carbon dioxide  
bicarbonate synthesis and, 712-14  
Bohr effect and, 187-88  
diffusion of, 624-27  
hydration-dehydration reaction of, 627-28
- Carbon dioxide exchange, 623-24  
in blood, 625-35  
capillary transit time and, 632-33  
in kidney, 653-65  
in liver, 683-89  
in lung, 639-50  
in muscle, 669-83  
oxygen-dependent, 629-31  
in vivo  
determinants of, 647-50
- Carbonic anhydrase  
carbon dioxide exchange and, 628, 640-44  
cytosolic, 685-86  
extracellular, 680-82  
gluconeogenesis and, 688-89  
localization and function in kidney, 654-65  
mitochondrial, 682, 686-89  
in muscle, 670-71  
neuromuscular junction, 683  
sarcolemmal, 680-82  
sarcolemmal reticulum, 682-83  
ureagenesis and, 688
- Carbonic anhydrase II  
cytosolic, 680
- Carbonic anhydrase III, 671-79  
esterase activity of, 674  
hydratase activity of, 672-74  
localization of, 672  
neuronal control of, 675-77  
phosphatase activity of, 675-75  
physiological role of, 677-79
- Carboxypeptidase B  
non-basic amino acids and, 309
- Carboxypeptidase E, 309-20  
molecular biology of, 317-19  
peptidyl-glycine  $\alpha$ -amidating monooxygenase and, 342  
purification of, 311-14  
regulation of, 316-17  
tissue distribution of, 314-16
- Cardiac muscle  
carbonic anhydrase in, 670-71
- Cardiolipins  
electric charge of, 274
- Cardiorespiratory homeostasis, 593-601
- Cardiovascular neurons  
identification of, 597  
respiratory neurons and, 597-601
- Cardiovascular system  
neural regulation of, 509-10  
pain responses of, 607-18  
sympathetic afferent fibers of, 608
- Catalase  
peptide  $\alpha$ -amidation and, 336
- Catecholamines  
bombesin and, 26  
chloride depletion alkalosis and, 149-50  
luteal steroidogenesis and, 469  
peptide  $\alpha$ -amidation and, 336, 340  
sodium-potassium-ATPase and, 295  
sympathetic preganglionic neurons and, 554
- Caudal ventrolateral medulla  
vasomotor tone and, 516-17
- Central nervous system  
cardiorespiratory homeostasis and, 593-601
- Central nervous system peptides  
See Neuropeptides
- Cerebellum  
cardiorespiratory control and, 601
- Cerebrospinal fluid  
bicarbonate synthesis in, 706-9
- Chemoreceptors  
sympathetic neural activity and, 570
- Chloride  
Bohr effect and, 186-87  
metabolic alkalosis and, 142-50  
respiratory acidosis and, 153-54
- Chloride ion channel blockers  
sodium chloride reabsorption and, 115
- Chloride ion channels  
acinar cell  
calcium-activated, 68
- Chloride transport  
acid-base balance and, 141-54  
collecting duct system and, 131-36  
distal nephron and, 111-20  
distal tubule and, 130-31  
loop of Henle and, 126-30  
proximal tubule and, 97-107, 124-26
- Chloroplasts  
adenosine triphosphate synthesis in, 277
- Chlorthiazide  
metabolic alkalosis and, 142
- Chloruresis  
respiratory acidosis and, 153
- Chlorzolate  
carbonic anhydrase III and, 674
- Cholecystokinin  
acinar cell ion channels and, 71  
acinar cell receptors for, 66  
gastric acid secretion and, 23-24, 52  
myenteric plexus and, 90  
peptide  $\alpha$ -amidation and, 341  
precursor of  
tyrosine sulfation sites in, 368  
sodium-potassium pump and, 300  
sympathetic preganglionic neurons and, 556, 560  
tyrosine sulfation and, 371
- Cholesterol  
lipid bilayers and, 259-60, 265-67  
pregnenolone production from, 428, 450  
sterol carrier protein 2 and, 435-36
- Cholesterol ester hydrolase  
steroid hormone synthesis and, 435
- Choline chloride  
chloride depletion alkalosis and, 149
- Chromaffin granules  
precursor processing and, 310
- Cimetidine  
gastrin release and, 46
- Citrulline synthesis  
sulfonamides and, 688
- Clonidine  
spinal man and, 587  
sympathetic neural activity and, 571  
sympathetic preganglionic neurons and, 554
- Collagenase  
ovulation and, 453-54
- Concanavalin A  
T lymphocytes and, 209
- Congenital adrenal hyperplasia  
steroid 21-hydroxylase deficiency and, 435

- Copper  
peptide  $\alpha$ -amidation and, 341
- Coronary artery occlusion  
pain responses to, 611
- Corpus luteum  
endocrine regulation of, 465-77  
luteotropic hormones and, 468-69  
vasculature of  
regulation of, 471-76
- Corticosterone  
conversion to aldosterone, 429  
formation of, 428-29
- Corticotropin-like intermediate lobe peptides  
proopiomelanocortin and, 324
- Corticotropin-releasing factor  
gastric acid secretion and, 29-30  
sympathetic preganglionic neurons and, 560
- Cortisol  
formation of, 428-29
- Cortisol secretion  
adrenocorticotrophic hormone and, 417
- COS cells  
neuroendocrine precursor proteins and, 326-27
- Cushing's syndrome, 417
- Cutaneous receptors  
sympathetic neural activity and, 569-70
- Cysteamine  
gastric acid secretion and, 25
- Cysteine  
gastrin release and, 44-45
- Cytochrome P-450  
17 $\alpha$ -hydroxylase  
estradiol synthesis and, 448-49  
17 $\alpha$ -hydroxypregnenolone formation and, 428
- aromatase  
estradiol synthesis and, 450  
estrogen production and, 430
- cholesterol side-chain  
cleavage  
progesterone biosynthesis and, 450-52
- steroidogenic forms of, 435  
factors regulating, 437-38
- Cytoplasm  
carbonic anhydrase III in, 671-79
- Cytosol  
carbonic anhydrase in, 680, 685-86
- D
- Dantrolene  
cytosolic bound calcium and, 417
- Dehydroascorbate  
peptide  $\alpha$ -amidation and, 340
- Deoxycorticosterone  
formation of, 428
- 11-Deoxycortisol  
formation of, 428
- Dermorphin  
gastric acid secretion and, 31
- Desamido-gastrin  
gastric acid secretion and, 47
- Dexamethasone  
chloride reabsorption and, 129  
inner medullary collecting tubule and, 136  
outer medullary collecting tubule and, 135
- Diacylglycerol  
acinar cell receptors and, 65  
aldosterone secretion and, 413  
protein kinase C and, 213
- Diethyldithiocarbamate  
peptide  $\alpha$ -amidation and, 336, 341
- 5,7-Dihydroxytryptamine  
sympathetic preganglionic neurons and, 558
- 2,3-Diphosphoglycerate  
erythrocytic phosphate modulation and, 162
- Disulfiram  
peptide  $\alpha$ -amidation and, 341
- Diuretics  
chloruretic  
metabolic alkalosis and, 142  
loop  
sodium chloride reabsorption and, 114-15
- DMB-8  
cytosolic bound calcium and, 417
- Dopamine  
aldosterone secretion and, 421-22  
bombesin and, 26  
sympathetic preganglionic neurons and, 554
- Dopamine  $\beta$ -hydroxylase  
peptide  $\alpha$ -amidation and, 336-37
- Dorsal medulla  
vasomotor tone and, 517-19
- Dorsal vagal complex  
gastric acid secretion and, 20
- Dorsomedial medulla  
cardiorespiratory control and, 599
- Drosophila*  
myosin gene of  
DNA sequencing and, 10
- Drosophila melanogaster*  
acetylcholine receptor of, 381-83  
bang-sensitive mutants of, 386-87  
ion channels in, 379-90  
potassium, 384-86  
sodium, 383-84  
*Shaker* mutant of, 384-86  
vitellogenin 2 of  
tyrosine sulfation and, 372
- Dynorphin  
gastric acid secretion and, 31  
myenteric plexus and, 90
- E
- Ectotherms  
See Hemoglobin, ectothermic vertebrate
- Elasmobranch  
rectal gland of, 713-14
- Electroconformational coupling, 273-89  
energetics of, 281-82
- $\beta$ -Endorphin  
aldosterone secretion and, 417-18  
gastric acid secretion and, 30-31  
Leydig cell and, 502  
proopiomelanocortin and, 324
- Endothelial growth factor  
luteal angiogenesis and, 472
- Endothelium-stimulating factor  
luteal angiogenesis and, 472
- Enkephalins  
carboxypeptidase E and, 313  
gastric acid secretion and, 31, 51-52  
myenteric plexus and, 90  
precursors of  
adrenal chromaffin granules and, 310  
reserpine and, 342  
sympathetic preganglionic neurons and, 556, 560
- Enprostil  
gastrin release and, 46
- Enteroglucagon  
gastric acid secretion and, 52, 54
- Epidermal growth factor  
calcium channel activation and, 209-10  
fibroblasts and, 209  
luteal angiogenesis and, 472  
tyrosine kinase activity on, 208

- Epidermoid carcinoma cells  
sodium entry into  
growth factors and, 212
- Epinephrine  
gastrin release and, 50  
sympathetic preganglionic  
neurons and, 554-56
- Erythrocyte membrane  
carbon dioxide diffusion and,  
626-27  
lung carbon dioxide exchange  
and, 644-47
- Erythrocytes  
calnactin and, 292-94  
sodium-potassium pump and,  
232
- Escherichia coli*  
adenosine triphosphate synthe-  
sis in, 277  
 $\beta$ -galactoside transport system  
of, 244  
*lac* operon of  
structural genes of, 244  
*lac* permease of  
mutagenesis of, 243-55  
*mel* permease of, 254-55
- Estradiol  
gonadotropins and, 442  
ovarian follicle and, 442  
synthesis of  
regulation of, 448-52
- Estradiol receptor  
amino acid sequence of, 442
- Estrogen  
corpus luteum and, 467  
luteal blood flow and, 472-73  
production of, 430  
relaxin biosynthesis and, 453
- Ethoxzolamide  
citrulline synthesis and, 688
- N*-Ethylmaleimide  
*lac* permease mutagenesis  
and, 245-46
- Eye  
bicarbonate synthesis in, 704-  
6
- F
- Factor X  
tyrosine sulfation and, 371
- Fatty acids  
electric charge of, 274
- Fatty acid synthesis  
acetyl CoA carboxylase and,  
684-85
- Fibroblast growth factor  
calcium channel activation  
and, 209
- Fibroblasts  
growth factors and, 209  
sodium entry into  
growth factors and, 212
- tyrosine sulfation in, 366
- Follicle-stimulating hormone  
Leydig cell differentiation  
and, 484  
ovarian follicle and, 442
- Forskolin  
Leydig cell and, 490
- Furosemide  
chloride reabsorption and, 99  
metabolic alkalosis and, 142,  
144  
sodium chloride reabsorption  
and, 112-15
- G
- $\beta$ -Galactosidase  
*Escherichia coli* Z gene and,  
244
- Galanin  
amino acid  $\alpha$ -amide of, 333  
myenteric plexus and, 90
- Gastric acid secretion  
bombesinlike peptides and,  
25-27, 49-50  
calcitonin and, 27-28  
calcitonin gene-related peptide  
and, 28-29  
cephalic phase of, 41-43  
cholecystokinin and, 23-24  
corticotropin releasing factor  
and, 29-30  
gastric phase of, 43-52  
gastrin and, 23-24  
neurotensin and, 30-31  
opioid peptides and, 30-31  
oxytocin and, 23  
peptide regulation of, 17-54  
central nervous system and,  
19-33  
somatostatin and, 24-25, 41,  
48, 52-53  
thyrotropin releasing hormone  
and, 21-23
- Gastric distention  
gastrin release and, 43-44
- Gastric inhibitory polypeptide  
gastric acid secretion and, 52
- Gastrin  
food-stimulated acid secretion  
and, 47-48  
gastric acid secretion and, 17-  
18, 23-24, 41-42  
methionine oxidation and, 47  
peptide  $\alpha$ -amidation and, 341  
precursor of  
structure of, 46-47  
tyrosine sulfation and, 372
- Gastrin release  
antisecretory agents and, 46  
bombesin and, 50-51  
food-stimulated  
cholinergic modulation of,  
45  
gastric distention and, 43-44  
hypoglycemic and adrenergic  
stimulation of, 42-43  
pH dependence of, 45  
somatostatin and, 48-49  
stimulants of, 44-45  
vagotomy and, 43
- Gastrin releasing peptide  
gastric acid secretion and, 25,  
50  
gastrin release and, 50-51
- Glomerular filtration rate  
metabolic alkalosis and, 147-  
49
- Glossopharyngeal neuralgia  
sympathetic neural activity  
and, 573
- Glucagon  
cortical collecting tubule and,  
133  
distal tubule and, 131  
gastrin release and, 49  
proximal chloride reabsorption  
and, 125  
sodium chloride reabsorption  
and, 114
- Glucoamylase  
yeast *Kex2* endoprotease and,  
352
- Glucocorticoids  
cortical collecting tubule and,  
133-34  
peptidyl-glycine  $\alpha$ -amidating  
monooxygenase and, 342  
proximal chloride reabsorption  
and, 126  
sodium chloride reabsorption  
and, 114
- Gluconeogenesis  
carbonic anhydrase and, 688-  
89  
phosphoenolpyruvate carboxy-  
kinase and, 684  
pyruvate carboxylase and,  
685
- 2-deoxy-D-Glucose  
gastric acid secretion and, 25
- Glucose transporter  
lipid bilayers and, 262-67
- Glutamate  
sympathetic preganglionic  
neurons and, 547, 558
- D-Glutamylglycine  
sympathetic preganglionic  
neurons and, 547
- Glycerol trinitrate  
spinal man and, 586
- Glycine  
arterial pressure and, 512  
sympathetic preganglionic  
neurons and, 559

- Golgi complex  
   tyrosylprotein sulfotransferase and, 366-68
- Gonadotropin  
   estradiol and, 442  
   genes encoding  
     cloning of, 441  
   Leydig cell function and, 491-93
- Gonadotropin releasing hormone cDNA for  
   isolation of, 441  
   Leydig cell function and, 499-502
- Gonadotropin releasing hormone-associated peptide cDNA for  
   isolation of, 441  
   ovarian synthesis of, 453
- Growth factors  
   binding to cell surface receptors, 208  
   second messengers and, 437  
   See also specific type
- Growth hormone  
   luteinizing hormone binding sites and, 483-84  
   SV40 and, 326
- Guanosine triphosphate  
   erythrocytic phosphate modulation and, 163  
   phosphoenolpyruvate carboxykinase and, 684
- Guillain-Barre syndrome  
   sympathetic neural activity in, 572
- H**
- Haloperidol  
   peptidyl-glycine  $\alpha$ -amidating monooxygenase and, 342
- Heart  
   sodium-potassium pump and, 232-34  
   sympathetic afferent fibers of, 608
- Heart disease  
   ischemic  
     referred pain in, 610
- Heart failure  
   sympathetic neural activity and, 573
- Hemoglobin  
   ectothermic vertebrate, 161-74  
   qualitative adaptations of, 165-71  
   quantitative adaptations of, 164-65  
   regulatory mechanisms for, 171-73  
   structure and function of, 162-64
- oxygen binding by  
     Bohr effect and, 181-99  
     Root effect and, 193-97
- Hepatocytes  
   sodium-potassium pump of  
     phorbol esters and, 299-300
- Hexamethonium  
   carboxypeptidase E and, 316
- Histamine  
   gastric acid secretion and, 17-18, 25, 41  
   gastrin release and, 46
- Histidine  
    $\beta$ 146  
     Bohr effect and, 183-86
- HMG CoA reductase  
   steroid hormone synthesis and, 435-36
- Hormones  
   acinar cell ion channels and, 70-73  
   acinar cell receptors for, 65-66
- Human chorionic gonadotropin  
   luteal steroidogenesis and, 469  
   ovarian blood flow and, 473-74
- Humans  
   sympathetic neural activity in, 565-73
- Hydrochloric acid  
   gastric acid secretion and, 52
- 6-Hydroxydopamine  
   myenteric plexus and, 85
- 17 $\alpha$ -Hydroxypregnenolone  
   formation of, 428
- Hypergastrinemia  
   hyperthyroidism and, 43
- Hyperinsulinemia  
   proximal sodium reabsorption and, 125
- Hyperthyroidism  
   hypergastrinemia and, 43
- Hypoglycemia  
   insulin-induced  
     gastric acid secretion and, 42-43  
     spinal man and, 584  
   sympathetic neural activity and, 570
- Hypotension  
   arterial  
     ventrolateral medullary lesions and, 511
- Hypothalamus  
   cardiorespiratory control and, 601  
   gastric acid secretion and, 20
- I**
- Imidazoline  
   spinal man and, 587
- Immunoglobulin M  
   tyrosine sulfation and, 371
- Indomethacin  
   chloride reabsorption and, 129
- Inhibin  
   amino acid sequences of, 452
- Inositol pentaphosphate  
   erythrocytic phosphate modulation and, 162
- Inositol polyphospholipids  
   intracellular calcium and, 209
- Inositol trisphosphate  
   acinar cell receptors and, 65-66  
   aldosterone secretion and, 413  
   T lymphocyte calcium channels and, 74
- Insular cortex  
   cardiorespiratory control and, 601
- Insulin  
   corpus luteum and, 467  
   gastric acid secretion and, 25  
   luteal angiogenesis and, 472  
   sodium-potassium pump and, 298-99
- Insulinlike growth factor 1  
   ovarian synthesis of, 453
- Ion channels  
   acinar cell, 66-68  
   activation of, 70-73  
   secretion and, 75-77  
   *Drosophila*, 379-90  
   vertebrate  
     genetic analysis of, 395-403  
     voltage-sensitive, 395-96  
     genetic analysis of, 377-78  
   See also specific type
- Ischemic heart disease  
   referred pain in, 610
- 2-(methylamino)-Isobutyric acid  
   cotransport in acinar cells, 70
- Isocitrate dehydrogenase  
   carbon dioxide and, 684
- Isoproterenol  
   cortical collecting tubule and, 133  
   distal tubule and, 131  
   proximal sodium chloride reabsorption and, 125
- J**
- Jacobs-Stewart cycle, 163
- Juxtaglomerular apparatus  
   vasoconstrictor neurons supplying, 531
- K**
- Ketanserin  
   sympathetic preganglionic neurons and, 554

- 17-Ketosteroid reductase  
progesterone conversion to  
androstenedione and, 448
- Kidney  
bicarbonate synthesis in, 709  
carbon dioxide exchange in,  
653-65  
carbonic anhydrase in, 654-  
65  
vasoconstrictor neurons  
supplying, 531
- Klebsiella aeruginosa*  
*lac Y* gene of, 255
- Krebs cycle  
pyruvate dehydrogenase and,  
684
- Kynurenate  
sympathetic preganglionic  
neurons and, 558
- L
- lac* operon  
structural genes of, 244
- lac* permease  
*Escherichia coli Y* gene and,  
244  
Glu325 and, 249-54  
His322 and, 247-54  
mutagenesis of, 243-55  
site-directed, 245-47
- Lens  
bicarbonate synthesis in, 712-  
13
- Leydig cell, 483-503  
cAMP and, 489-91  
function of  
hormonal control of, 491-  
99  
paracrine/autocrine effects  
on, 499-502  
protein kinase activation and,  
489-91  
purification of, 484-87
- Leydig cell receptors, 487-89
- Lipid bilayers  
glucose transporter and, 262-  
67  
human erythrocyte sugar  
transport and, 257-69  
membrane proteins and, 261-  
62  
properties of, 259-61
- Lipids  
membrane  
electric charge of, 274-75
- $\beta$ -Lipotropin  
proopiomelanocortin and, 324
- $\gamma$ -Lipotropin  
proopiomelanocortin and, 324
- Litorin  
gastric acid secretion and, 25
- Liver  
carbon dioxide exchange in,  
683-89
- Locus coeruleus  
gastric acid secretion and, 20
- Loop diuretics  
sodium chloride reabsorption  
and, 114-15
- Loop of Henle  
chloride transport in, 126-30
- Lung  
carbon dioxide exchange in  
velocity of, 639-50
- Luteinization  
steroidogenesis and, 466-68
- Luteinizing hormone  
corpus luteum and, 468
- Luteinizing hormone receptor  
ovarian follicle and, 442-43
- Luteotropic hormones, 468-69  
relationships in monkey, 469-  
71
- M
- Macrophage colony stimulating  
factor  
tyrosine kinase activity on,  
208
- Mammals  
cardiorespiratory control in,  
593-601
- Meclofenamate  
chloride reabsorption and, 129
- Medulla  
gastric afferent and efferent  
pathways in, 20
- Medullary basal sympathetic  
tone, 511-20
- $\alpha$ -Melanocyte-stimulating hor-  
mone  
aldosterone secretion and, 417  
proopiomelanocortin and, 324
- $\beta$ -Melanocyte-stimulating hor-  
mone  
aldosterone secretion and,  
417-18
- mel* permease, 254-55
- Membrane lipids  
electric charge of, 274-75
- Membrane proteins  
lipid bilayers and, 261-62
- Mental stress  
sympathetic neural activity  
and, 570-71
- Metabolic alkalosis, 141-52  
Barter's syndrome and, 152  
chloride depletion in, 142-50  
mineralocorticoid excess and,  
150-52  
potassium depletion and, 150-  
52
- Metergoline  
sympathetic preganglionic  
neurons and, 557
- Methazolamide  
avian salt gland and, 714
- Methionine oxidation  
gastrin and, 47
- Methysergide  
sympathetic preganglionic  
neurons and, 557
- Metoprolol  
sympathetic neural activity  
and, 571
- Metorphamide  
reserpine and, 342
- Migraine  
sympathetic neural activity  
and, 573
- Mineralocorticoids  
chloride transport and, 119-20  
cortical collecting tubule and,  
133-34  
inner medullary collecting  
tubule and, 136  
metabolic alkalosis and, 150-  
52
- Mitochondria  
adenosine triphosphate synthe-  
sis in, 277  
carbonic anhydrase in, 682,  
686-89  
pregnenolone formation in,  
428
- Mitogens, 207-19  
binding to cell surface recep-  
tors, 208  
channel activation by, 210-11  
intracellular calcium and, 209  
sodium ion/hydrogen ion ex-  
change and, 211-13
- Monoamine oxidase  
gastrin release and, 51
- Monoamines  
sympathetic preganglionic  
neurons and, 554-58
- Morphine  
gastric acid secretion and, 52
- Mosquito larva  
rectal salt gland of, 710
- Mullerian inhibiting substance  
embryogenesis and, 452-53
- Muscimol  
gastric acid secretion and, 25
- Muscle  
carbon dioxide exchange in,  
669-83  
carbonic anhydrase in, 670-71  
sodium-potassium pump and,  
231-32
- Muscle nerve sympathetic activ-  
ity, 565-73  
appearance of, 567-68  
burst pattern of, 566

- pathophysiology of, 572-73
- pharmacological alterations of, 571
- plasma norepinephrine and, 571-72
- receptors and, 569-70
- Muscular contraction, 1-13
- adenosine triphosphate and, 2
- birefringence and, 12-13
- cross-bridge cycle and, 6-8
- sliding filaments and, 2-6
- X-ray diffraction and, 11-12
- Muzolimine
  - sodium chloride reabsorption and, 115
- Myenteric plexus, 81-91
  - morphology and fine structure of, 82-84
  - neural circuitry of, 84-90
  - neurotransmitter colocalization in, 90
- Myocardial ischemia
  - sympathetic sensory fibers of heart and, 608
- Myosin gene
  - DNA sequencing and, 10
- N
- Nalmefene
  - gastric acid secretion and, 51
- Naloxone
  - gastric acid secretion and, 51
- Nephron
  - distal
    - chloride transport in, 111-20, 123-36
  - proximal
    - chloride transport in, 123-36
- Nerve
  - sodium-potassium pump and, 229-31
- Neuroblastoma cells
  - sodium entry into
    - growth factors and, 212
- Neuromedin K
  - myenteric plexus and, 86
- Neuromuscular junction
  - carbonic anhydrase in, 683
- Neurons
  - in myenteric plexus, 82-84
  - See also specific type
- Neuropeptide K
  - amino acid  $\alpha$ -amide of, 333
- Neuropeptides
  - gastric acid secretion and, 19-33, 41
  - gene transfer techniques and, 323-30
  - Leydig cell and, 484
  - recombinant DNA and, 305-7
  - sympathetic preganglionic neurons and, 559-61
  - tyrosine sulfation and, 363, 371
- Neuropeptide Y
  - amino acid  $\alpha$ -amide of, 333
  - myenteric plexus and, 87
  - sympathetic preganglionic neurons and, 556
  - vasoconstriction and, 526
  - vasoconstrictor neurons and, 534
- Neurophysin
  - sympathetic preganglionic neurons and, 560
- Neurotensin
  - gastric acid secretion and, 32, 52
  - sympathetic preganglionic neurons and, 556, 560
- Neurotoxin receptors
  - sodium ion channels and, 397-98
- Neurotransmitters
  - acinar cell ion channels and, 70-73
  - acinar cell receptors for, 65-66
  - aldosterone secretion and, 420
  - myenteric plexus and, 84
  - sympathetic preganglionic neurons and, 548-49, 553-62
- Neutrophils
  - platelet-activating factor and, 210
- Nicotine
  - carboxypeptidase E and, 316
- Nifedipine
  - spinal man and, 587
- Nitrendipine
  - cytosolic bound calcium and, 417
- Norepinephrine
  - acinar cell receptors for, 66
  - gastric acid secretion and, 27
  - myenteric plexus and, 84
  - proximal sodium chloride reabsorption and, 125-26
  - sodium-potassium-ATPase and, 295
  - sodium-potassium pump and, 299
  - sympathetic neural activity and, 571-72
  - sympathetic preganglionic neurons and, 548, 554-56
  - vasoconstriction and, 526
- Nucleoside triphosphates
  - erythrocytic phosphate modulation and, 163
- O
- Omeprazole
  - gastrin release and, 46
- Oocytes
  - sodium-potassium pump and, 234-35
- Opioid peptides
  - gastric acid secretion and, 30-31, 51-52
- Leydig cell and, 502
- precursor proteins of, 324
- Ouabain
  - calmodulin and, 298-99
  - sodium-potassium-ATPase and, 279-81
- Ovarian follicle, 441-58
  - adenylyl cyclase and, 443-44
  - cAMP-dependent protein kinases and, 444-47
  - protein hormone receptors of, 442-43
  - steroid hormone receptors of, 442
- Ovarian peptides, 452-53
- Ovulation, 453-56
- Oxaloacetate
  - phosphoenolpyruvate carboxy-kinase and, 684
- Oxyntomodulin
  - See Enteroglucagon
- Oxyntopyloric reflex, 44
- Oxytocin
  - corpus luteum and, 453
  - gastric acid secretion and, 23
  - sympathetic preganglionic neurons and, 560
- P
- Pain
  - cardiovascular response to, 607-18
- Pancreas
  - bicarbonate synthesis in, 699-703
- Pancreastatin
  - amino acid  $\alpha$ -amide of, 333
- Pancreatic acinar cells
  - See Acinar cells
- Pandysautonomia
  - sympathetic neural activity in, 572
- Parathyroid hormone
  - distal tubule and, 131
  - proximal chloride reabsorption and, 124-25
- Pentagastrin
  - gastric acid secretion and, 25
- Pentobarbitone
  - arterial pressure and, 512
- Pepsin
  - sham feeding and, 42



- Peptide  $\alpha$ -amidation, 333-42  
 physiology of, 337-42  
 Peptide histidine isoleucine  
 amino acid  $\alpha$ -amide of, 333  
 Peptides  
 central nervous system  
 gastric acid secretion and,  
 19-33  
 myenteric plexus and, 84  
 Peptide tyrosine tyrosine  
 amino acid  $\alpha$ -amide of, 333  
 Peptide YY  
 gastric acid secretion and, 52  
 Peptidyl-glycine  $\alpha$ -amidating  
 monooxygenase  
 peptide  $\alpha$ -amidation and, 336-  
 42  
 pH  
 gastrin release and, 45  
 1,10-Phenanthroline  
 peptide  $\alpha$ -amidation and, 336  
 Phenoxybenzamine  
 proximal reabsorption and,  
 126  
 Phenylalanine  
 gastrin release and, 44  
 Phenylephrine  
 proximal sodium chloride  
 reabsorption and, 125  
 spinal man and, 586  
 sympathetic neural activity  
 and, 571  
 sympathetic preganglionic  
 neurons and, 554  
 Pheromones  
 yeast, 345  
 Phorbol esters  
 second messengers and, 437  
 sodium ion-hydrogen ion ex-  
 change and, 213-14  
 sodium-potassium pump and,  
 299-300  
 Phosphatidic acids  
 electric charge of, 274  
 Phosphatidylethanolamines  
 electric charge of, 274  
 Phosphatidylinositol-4,5-  
 bisphosphate  
 phospholipase C and, 208  
 Phosphatidylserines  
 electric charge of, 274  
 Phosphoenolpyruvate carboxy-  
 kinase  
 glucose synthesis and, 684  
 Phospholipase C  
 acinar cell receptors for, 65-  
 66  
 aldosterone secretion and,  
 413  
 phosphatidylinositol-4,5-  
 bisphosphate and, 208  
 Phospholipids  
 lipid bilayers and, 260  
 Piperoxane  
 sympathetic preganglionic  
 neurons and, 554, 556  
 Pituitary  
 aldosterone secretion and,  
 417-20  
 Plasmacytoma cells  
 sodium-potassium-ATPase of  
 ouabain and, 298  
 Plasmid transfection  
 retroviruses and, 326  
 Plasminogen activator  
 ovulation and, 453-54  
 Platelet-activating factor  
 neutrophils and, 210  
 Platelet-derived growth factor  
 fibroblasts and, 209  
 tyrosine kinase activity on,  
 208  
 Polyneuropathy  
 sympathetic neural activity in,  
 572  
 Pons  
 cardiorespiratory control and,  
 601  
 Potassium  
 aldosterone secretion and,  
 415-17  
 cAMP and, 417  
 metabolic alkalosis and, 150-  
 52  
 sympathetic sensory fibers of  
 heart and, 608  
 Potassium chloride  
 chloride depletion alkalosis  
 and, 149  
 Potassium ion channels  
 acinar cell  
 calcium-activated, 66-68  
*Drosophila*, 384-86  
 somatic cell hybrids and, 396-  
 97  
 Prazosin  
 sympathetic preganglionic  
 neurons and, 554  
 Pregnenolone  
 production from cholesterol,  
 428, 450  
 Preproenkephalin  
 vaccinia virus and, 327  
 Preprogastrin, 46-47  
 Preproinsulin  
 COS cells and, 327  
 Preproiomelanocortin  
 COS cells and, 327  
 vaccinia virus and, 327  
 Preprosomatostatin  
 COS cells and, 327  
 Pressor agents  
 spinal man and, 585-86  
 Proenkephalin  
 proteolytic maturation of, 325  
 Proenkephalin A, 324  
 Proenkephalin B, 324  
 Progesterone  
 biosynthesis of  
 cholesterol side-chain cleav-  
 age cytochrome P-450  
 and, 450-52  
 conversion to an-  
 drostenedione, 448  
 corpus luteum and, 467  
 formation of, 428  
 ovarian follicle and, 442  
 Progesterone secretion  
 prolaction and, 468  
 Proglucagon  
 proteolytic maturation of, 325  
 Proinsulin  
 proteolytic maturation of, 325  
 SV40 and, 326  
 yeast *Kex2* endoprotease and,  
 352  
 Prolactin  
 luteinizing hormone binding  
 sites and, 483-84  
 progesterone secretion and,  
 468  
 Prolactin receptor  
 ovarian follicle and, 443  
 Proopiomelanocortin  
 aldosterone secretion and, 417  
 opioid peptides and, 324  
 ovarian synthesis of, 453  
 yeast *Kex2* endoprotease and,  
 352  
 Propranolol  
 gastrin response to hypog-  
 lycemia and, 43  
 sympathetic neural activity  
 and, 571  
 Prosomatostatin  
 proteolytic maturation of, 325  
 Prostacyclin synthase  
 ovulation and, 455  
 Prostaglandins  
 Bartter's syndrome and, 152  
 gastric acid secretion and, 53  
 gastrin release and, 46  
 luteal angiogenesis and, 472  
 luteal steroidogenesis and,  
 469  
 ovulation and, 453-56  
 sodium chloride reabsorption  
 and, 114  
 spinal man and, 586  
 sympathetic sensory fibers of  
 heart and, 608  
 thick ascending limb and,  
 128-29  
 Protein kinase C  
 diacylglycerol and, 213  
 sodium ion-hydrogen ion ex-  
 change and, 213-15  
 sodium-potassium-ATPase  
 and, 299-300

- Protein kinases  
 cAMP-dependent  
   Leydig cell and, 489-91  
   ovarian follicle and, 444-47  
 Proteins  
   electroconformational changes  
     of, 275-77  
   tyrosine-sulfated  
     characteristics of, 364-66  
     occurrence of, 363-64  
   See also specific type  
 Proto-oncogenes, 208  
 Pyrimidine synthesis  
   carbamyl phosphate synthetase  
     and, 685  
 Pyruvate carboxylase  
   gluconeogenesis and, 685  
 Pyruvate dehydrogenase  
   carbon dioxide and, 684
- Q**
- Quadriplegia  
 See Spinal man
- R**
- Ranatsin  
   gastric acid secretion and, 25  
 Raynaud phenomenon  
   sympathetic neural activity  
     and, 573  
 Recombinant DNA  
   neuropeptides and, 305-7  
 Relaxin  
   biosynthesis of, 453  
 Renal tubular acidosis  
   chloride shunt and, 152  
 Renal tubules  
   collecting  
     chloride transport in, 118-20, 131-36  
   distal  
     chloride transport in, 130-31  
   distal convoluted  
     sodium chloride transport  
     in, 115-18  
   proximal  
     chloride transport in, 97-107, 124-26  
 Renin  
   spinal man and, 586  
 Renin-aldosterone system  
   Bartter's syndrome and, 152  
 Renin-angiotensin system  
   aldosterone secretion and,  
     410-15  
   Leydig cell and, 491  
 Reserpine  
   enkephalins and, 342  
 Respiratory acidosis, 153-54
- Respiratory neurons  
   cardiovascular neurons and,  
     597-601  
   identification of, 597  
 Retroviruses  
   plasmid transfection and, 326  
 Root effect, 193-97  
 Rostral ventrolateral medulla  
   vasomotor tone and, 512-16  
 RP 40749  
   gastrin release and, 46
- S**
- Saccharomyces cerevisiae*  
    $\alpha$ -factor of, 346-49  
   *Kex1* carboxypeptidase of,  
     354-55  
   *Kex2* endoprotease of, 350-54  
   killer toxin of, 346, 347,  
     349-50  
   mating pheromones of, 345  
   prohormone processing en-  
     zymes of, 345-58  
   *Ste13* exopeptidase of, 356-57  
 Salivary acinar cells  
   See Acinar cells  
 Salivary secretion  
   acetylcholine-evoked  
     calcium ion and, 65  
 Salt gland  
   avian, 714  
 Sarcoplasmic reticulum  
   carbonic anhydrase in, 682-83  
 Saxitoxin  
   sodium ion channels and,  
     397-98  
 Scorpion toxin  
   sodium ion channels and, 397  
 Sea anemone toxin  
   sodium ion channels and, 397  
 Secretin  
   gastric acid secretion and, 52-53  
   gastrin release and, 49  
 Secretogranin  
   tyrosine sulfation of, 366  
 Secretogranin I  
   tyrosine sulfation sites in, 368  
 Secretory granules  
   precursor processing and,  
     310-11  
 Serotonin  
   bombesin and, 26  
   gastrin release and, 51  
   myenteric plexus and, 84-85  
   sympathetic preganglionic  
     neurons and, 556-58  
 Skate  
   alkaline gland of, 709-10  
 Skeletal muscle  
   carbonic anhydrase in, 670-71  
   vasoconstrictor neurons  
     supplying, 530  
 Skin  
   vasoconstrictor neurons  
     supplying, 531-32  
 Skin nerve sympathetic activity,  
   565-73  
   appearance of, 568-69  
   burst pattern of, 566  
   pathophysiology of, 572-73  
   receptors and, 569-70  
 Sodium ion channels  
   *Drosophila*, 383-84  
   molecular biology of, 399-403  
   neurotoxin receptors and,  
     397-98  
   somatic cell hybrids and, 396-97  
 Sodium nitroprusside  
   sympathetic neural activity  
     and, 571  
 Sodium-potassium-ATPase  
   calmodulin and, 296-99  
   calnactin and, 292-95  
   modulation of, 291-300  
   ouabain and, 279-81  
   protein kinase C and, 299-300  
 Sodium-potassium pump  
   equilibrium potential of, 225-26  
   erythrocytes and, 232  
   heart tissue and, 232-34  
   insulin and, 298-99  
   kinetics of, 227-28  
   muscle tissue and, 231-32  
   nerve tissue and, 229-31  
   oocytes and, 234-35  
   reconstituted, 235-36  
   voltage dependence of, 225-37  
 Somatic cells  
   ion channels in, 396-99  
 Somatomedin C  
   corpus luteum and, 467  
 Somatostatin  
   aldosterone secretion and, 422  
   gastric acid secretion and, 24-25, 41, 48, 52-53  
   gastrin release and, 48-49  
   myenteric plexus and, 90  
   sympathetic preganglionic  
     neurons and, 556, 560  
 Spinal cord  
   vasomotor tone and, 519  
 Spinal man  
   basal state of, 577-78  
   cardiovascular control in,  
     577-90  
   pharmacological agents and  
     responses to, 585-87  
   physiological stimulation and  
     responses to, 578-85  
 Spinal shock, 587-90

- Steroid 21-hydroxylase deficiency  
congenital adrenal hyperplasia and, 435
- Steroid hormone receptors  
ovarian follicular, 442
- Steroid hormones  
biosynthesis of, 427-38  
pathways of, 428-30  
chloride reabsorption and, 129  
Leydig cell and, 484  
lipid bilayers and, 260  
See also Steroidogenesis
- Steroid hormone-secreting cells  
endocrine regulation of, 407
- Steroidogenesis  
luteinization and, 466-68  
regulation of, 430
- Steroidogenic enzymes  
adrenocorticotrophic hormone and, 431-34  
genes encoding, 434-35  
mRNA encoding, 432-34
- Sterol carrier protein 2  
steroid hormone synthesis and, 435-36
- Stilbenes  
chloride absorption in renal tubules and, 99
- Substance K  
myenteric plexus and, 86
- Substance P  
acina cell receptors for, 66  
bombesin and, 27  
myenteric plexus and, 86-87  
sympathetic preganglionic neurons and, 554, 559-60
- Sulfonamides  
carbonic anhydrase III and, 673-74  
citrulline synthesis and, 688
- SV40  
neuroendocrine precursor proteins and, 326
- Sympathetic ganglia  
vasoconstrictor neuron impulse transmission and, 533-34
- Sympathetic neural activity, 565-73  
burst pattern of, 566
- Sympathetic neurons  
vasoconstrictor neurons and, 532-33
- Sympathetic preganglionic neurons, 541-49  
action potential of, 543  
ionic basis of, 543-44  
A current in, 545-46  
after-depolarization of, 546  
after-hyperpolarization in, 544-45
- amino acids and, 558-59  
monoamines and, 554-58  
neuropeptides and, 559-61  
neurotransmitters and, 548-49, 553-62  
pacemaker activity of, 549  
resting membrane potential of, 542  
synaptic responses of, 546-48  
voltage relations of, 542-43
- Syncope  
sympathetic neural activity and, 573
- T
- Tachykinin  
myenteric plexus and, 86-87
- Testosterone  
production of, 429-30
- Tetrahydrobiopterin  
peptide  $\alpha$ -amidation and, 336, 340
- Tetraplegia  
See Spinal man
- Tetrodotoxin  
sodium ion channels and, 397-98  
sympathetic preganglionic neurons and, 543
- Thick ascending limb  
chloride transport in, 112-15, 126-29
- Thiogalactoside transacetylase  
*Escherichia coli* A gene and, 244
- $\alpha$ -Thrombin  
luteal angiogenesis and, 472
- Thyrotropin releasing hormone  
gastric acid secretion and, 21-23  
sympathetic preganglionic neurons and, 556, 560
- Tissue plasminogen activator  
ovulation and, 453-54
- T lymphocytes  
calcium channels in  
inositol triphosphate and, 74  
concanavalin A and, 209  
sodium entry into  
growth factors and, 212
- Toraseamide  
sodium chloride reabsorption and, 114-15
- Transferrin  
luteal angiogenesis and, 472
- Transforming growth factor  $\beta$ , 452
- Trypsin  
cleavage of, 309
- Tryptophan  
gastrin release and, 44
- Tyrosine sulfation, 363-72  
lack of reversibility of, 370-71  
neuropeptides and, 371  
proteolytic cleavage and, 371-72  
secretory protein transport and, 372  
sites of, 368-70
- Tyrosylprotein sulfotransferase, 366-71  
properties of, 368  
subcellular localization of, 366-68
- U
- Urea cycle  
carbamyl phosphate synthetase and, 685
- Ureagenesis  
carbonic anhydrase and, 688
- Urine  
carbon dioxide tension of, 664-65
- V
- Vaccinia virus  
neuroendocrine precursor proteins and, 327-28
- Vagotomy  
gastrin release and, 43
- Valine  
cotransport in acinar cells, 69
- Valsalva maneuver  
sympathetic neural activity and, 569
- Vasoactive intestinal peptide  
gastric acid secretion and, 52  
gastrin release and, 49  
myenteric plexus and, 86, 90  
ovarian synthesis of, 453  
sympathetic preganglionic neurons and, 556
- Vasoconstrictor neurons, 525-37  
discharge patterns of, 527-32  
impulse transmission in, 533-35  
sympathetic neurons and, 532-33
- Vasomotor tone  
generation of, 512-13  
spinal cord and, 519
- Vasopressin  
aldosterone secretion and, 419  
corpus luteum and, 453  
cortical collecting tubule and, 133-34  
sodium-potassium-ATPase and, 295

- sodium-potassium pump and, 299
  - sympathetic neural activity and, 571
  - sympathetic preganglionic neurons and, 560
  - Vasopressor agents
    - spinal man and, 586-87
  - Ventrolateral medulla
    - cardiorespiratory control and, 599-601
  - Verapamil
    - chloride reabsorption and, 129
  - Veratridine
    - sodium ion channels and, 397
    - sympathetic sensory fibers of heart and, 608
  - Vertebrates
    - ion channels of
      - genetic analysis of, 395-403
  - Viscera
    - vasoconstrictor neurons supplying, 531
  - Vitellogenin 2
    - tyrosine sulfation and, 372
- X
- X-ray diffraction
    - muscular contraction and, 11-12
- Y
- Yeast prohormone processing enzymes, 345-58
  - Yohimbine
    - sympathetic preganglionic neurons and, 554, 556

